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ABSTRACT

A description is provided of a conference session that was conducted to explore the structure and function of an environmental scanning/forecasting system that could be used in a community college to facilitate planning. Introductory comments argue that a college that establishes an environmental scanning and forecasting system is able to identify trends and events that, when forecasted, present both threats and opportunities to the college. Basic concepts and terms are defined next, including "environmental scanning," "trend," "event," and "emerging issues." Next, results are provided from the portion of the session in which participants acted as a planning team conducting an external analysis of Virginia community colleges. These results include lists of the social, technological, economic, and political trends that define the context in which the colleges will function in the coming decade, and lists of particular events, which if they occurred, would affect these trends or the colleges directly. The remainder of the paper provides a brief discussion of the establishment of an environmental scanning/forecasting system at a community college, focusing on the collection and dissemination of environmental information, the determination of key administrators' perceptions of important trends and events, the development of alternative scenarios of possible futures, the analysis of policies, and the development of action plans. Concluding comments emphasize the purpose of environmental scanning. (AJL)

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Developing Environmental Scanning/Forecasting Systems to Augment Community College Planning

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DEVELOPING ENVIRONMENTAL SCANNING/FORECASTING SYSTEMS TO AUGMENT COMMUNITY COLLEGE PLANNING

The external environment of two-year colleges is turbulent. Leaders in the government are increasingly concerned about holding education accountable for its actions. The corporate community is concerned about the quality of entrants into the work force, particularly in an era of global competition. Technical advances in computers, robots, and videodisks have direct implications for changing instructional delivery systems.

Analysis of environmental change and the development of institutional policies to deal with this change are key to an organization's success. Literature on organizational analysis documents the effects of the general societal environment on organizations (Osborne & Hunt, 1974; Hall, 1977; Kast & Rosenzweig, 1979; Scott, 1981). Consequently, scanning the general environment for trends that affect the organization's mission is essential to developing an effective strategic plan (Bourgeois, 1980). In essence, a college that establishes an environmental scanning and forecasting system has benefits of an early warning system to identify trends and events that, when forecasted, present both threats and opportunities to the college. With early warning, administrators can prepare their response options in anticipation of changes implied by these trends and events. This system will increase management efficiency in dealing with uncertainties inherent in the future by anticipating change and influencing the future rather than by simply reacting to it.

While educational leaders have shown an interest in developing an environmental scanning/forecasting capability (Norris and Poulton, 1987), few have developed such a

system (Morrison, 1987). One reason for this state of affairs is the lack of experience in developing and operating such systems in higher education. Environmental scanning and forecasting techniques are used much more extensively in the corporate world, but the proprietary nature of this world has inhibited sharing of this technology. Boucher (1988) estimates that the development and use of these techniques in the corporate world is some 15 years ahead of that in the public sector.

The purpose of this session was to describe the structure and function of an environmental scanning/forecasting system as this system could be used in a community college to facilitate planning. After describing the elements of this system, session participants acted as a planning team conducting an external analysis of Virginia community colleges. This paper documents the "proceedings" of the session including the key trends and events that participants felt could affect the future of Virginia community colleges. The paper concludes with a brief description of the "next steps" Virginia community colleges could take to implement an environmental scanning/forecasting system.

Basic Concepts

A few concepts must first be defined. What is environmental scanning? What are trends and events? What is an emerging issue?

Brown and Weiner (1985) define environmental scanning as "a kind of radar to scan the world systematically and signal the new, the unexpected, the major and the minor (p. ix)." Aguilar (1967) has defined scanning as the systematic collection of external information in order to (a) lessen the randomness of information flowing into the organization and (b) provide early warnings for managers of changing external conditions. More specifically, Coates (1985) has identified the objectives of an environmental scanning system as including the following:

- detecting scientific, technical, economic, social, and political interactions and other elements important to the organization
- defining the potential threats, opportunities, or potential changes for the organization by those events
- promoting a future orientation in management and staff
- alerting management and staff to trends which are converging, diverging, speeding up, slowing down, or interacting (pp. 2-13, 14).

An example of the user of an environmental scanning system is an nuclear submarine captain. His periscope is not only equipped with optics to aid in viewing the immediate area out to the horizon, but it is also linked up to a satellite relay that allows him to see beyond the horizon. Each time he uses the periscope he is looking for possible targets (opportunities) and the enemy (threats). He scans the horizon for external environmental threats and opportunities.

By extension an environmental scanning system is structured to identify and evaluate trends, events, and emerging issues important to the institution. These terms are defined as follows:

• A **trend** is a series of social, technological, economic, or political characteristics that can usually be estimated and/or measured over time. It is a statement of a general direction of change, usually gradual long-term change, reflecting the forces shaping the region, nation, or society in general. Trend information may be used to describe the future, identify emerging issues, or project future events. For example, at most institutions student profiles are changing. Indicators of this trend are the number of minority students or the number of full-time adult students enrolling.

• An **event** is a discrete, confirmable occurrence that makes the future different from the past. An event would be, "Federal funding for students' financial aid is reduced by 50 %."

• An **emerging issue** is a potential controversy that arises out of a trend or event, which may require some form of response. For example, "Litigation, as measured by the number of law suits per year in American society, is increasing." An immediate consequence of this trend is substantially higher liability insurance for colleges. An emerging consequence arises from the tendency of state legislatures to protect the public by requiring licensure of an increasing number of occupations, including periodic updating of credentials. This consequence implies an enhanced opportunity for the expansion of continuing adult and professional/occupational education programs.

The Session

After a presentation of these basic concepts and an illustration of the types of information contained in an environmental scanning data base, we asked participants to identify critical trends that define the context within which Virginia community colleges would function in the coming decade, and potential events that could affect those trends or colleges directly. We encouraged participants to think broadly through all sectors (social, technological, economic, and political), and on levels from local through global. Below are those trends identified in a fifteen minute period are shown below:

Critical Trends

Social

- % of people needing retraining
- % of population with AIDS
- % of service area jobs
- % of urban population
- % of minority enrollment in Virginia community colleges
- % of women in Virginia community colleges
- ratio of out-of-state/in-state applicants for Virginia community colleges
- annual rate of population growth in Virginia
- % of community colleges (CC) converting from quarter to semester system

- % of students at Virginia senior colleges who transferred from Virginia community colleges
- % of high school non-graduates in work force
- % of Virginia community college curriculum devoted to international topics
- % of international students in Virginia community colleges
- % of poor seeking education after high school
- average age of Virginia population
- perceived reputation of Virginia community college education

Technological

- % of curriculum using interactive TV in Virginia community colleges
- % of Virginia community college students owning a computer
- % of students enrolled in hi-tech curriculums

Economic

- % of financial aid to non-college attendees
- % of private funding to Virginia community colleges
- % unemployment in Virginia
- number of foreign companies migrating to Virginia
- % of financial aid devoted to high school drop-outs

Political

- % of Virginia voters classified as conservative

We stressed that trends need to be stated in measurable terms for analytical purposes. For example, if the changing demographic composition of students enrolled in Virginia community colleges is a critical trend, in order to collect data and to forecast this trend, it is necessary to restate it as, "the percentage of minority enrolled," "the percentage of students over 30," "the percentage of women students," etc.

After the trend identification exercise, we asked participants to identify events, which if they occurred, would affect these trends or community colleges directly. In a few minutes they identified the 13 critical events listed below:

Critical Events

Social

- World War III breaks out
- Bush assassinated / Quayle becomes President
- Virginia community college faculty size increases 20% over next two years
- Virginia population increases 20% over next five years
- Epidemic in US increase
- Competition for students from four-year institutions increases 20% over next three years
- Significant increase in the number of full-time students

Technological

- Cure for AIDS is found
- Space station is established on Mars

Economic

- Dollar is devalued 20% by mid 1989
- Three major Virginia businesses close

Political

- Black rule in South Africa becomes a fact
- State mandates competency testing

Unfortunately, time did not permit forecasting either the probability of these events' occurring within the particular time frame or the impact of any of these events on community colleges. We devoted the remainder of the session to a brief discussion of how a community college could establish an environmental scanning/forecasting system.

Establishing the System

Coates (1986) has described how some corporations and associations have initiated an environmental scanning system. That is, they assign one or several individuals to

abstract information from a range of publications, including national newspapers, a few leading magazines, and some specialty publications. They then circulate abstracts in an internal newsletter. Morrison (1988) notes that a number of colleges are using this approach (e.g., Lane Community College, Piedmont Technical College, Grambling State University, and Georgia Southwestern).

To get started, the institutional researcher or the planning officer could initially interview the key decision-makers on campus to obtain their perceptions of what trends and events were critical to defining the context within which the campus would operate in the coming decade. The reseacher or planner could list the identified trends and events on a Round One (R1) Delphi questionnaire distributed to key faculty members and campus administrators. This questionnaire would request respondents to:

(1) forecast trend/events for the coming decade and the degree of impact these trends would have on the college if they materialized as forecasted

(2) forecast event cumulative probabilities over a specific time period (e.g., ten years) and the degree of impact on critical trends on the college these events would have if they were to occur

(3) nominate those trends and events not identified on the questionnaire but that may affect the college's future.

The planner could present the data collected from the questionnaire to key campus decision-makers at a 4-6 hour retreat in an analysis that shows the mean and frequency distribution of trend and event forecasts along with the mean impact estimate. The first exercise would be a discussion of the reasoning for the inevitable variation in each of the initial forecasts (called Round 1 or R1 forecasts). This discussion would serve several purposes. First, it may quickly become evident that in many instances, particular trends and events were not stated so that each participant had the same understanding of the statement. Second, the discussion will elicit information/conjecture vis-a-vis the

factors that may affect trend levels, event probabilities, as well as the impact of trends and events on the institution. Finally, through such discussions in repeated rounds, the way institutional decision-makers "see the world" becomes explicit, opening the possibility of developing a consistent, well informed, and reasoned institutional view of the "most likely future" of the school.

Developing Alternative Scenarios

Although the "most likely" future, the "bettable" future, is the one for which we must plan, we know that this future could be quickly altered if some critical, but low probability events occurred. Through systematically interrelating the trends and events in a cross-impact matrix, it is possible to play out a number of "what if" possibilities. In general, this process involves asking how the prior occurrence of a particular event might affect other events or trends in the set. When we have specified these relationships, it becomes possible to let events "happen"--either randomly, in accordance with their estimated probability, or in some prearranged way--and then trace out a new, distinct, plausible and internally consistent set of forecasts. This new set represents an alternative to the comparable forecasts in the "most likely" future. We can create many such alternatives . Indeed, if the model is computer based, the number will be virtually unlimited, given even a small base of trends and events and a short time horizon (e.g., the next ten years).

Scenarios are narrative descriptions of possible futures. A single scenario represents a history of the future. The "most likely" future, for example, contains all of the forecasts from the forecasting activity in a narrative, weaving them together from some point in the future, describing the history of how they unfold. Alternatives to this future are based upon the occurrence or non-occurrence of particular events in the event set. Such alternatives define unique mixes of future environmental forces that

may impact on a college or university. The range of uncertainty inherent in the different scenarios (which are, themselves, forecasts) changes the assumption that the future will be an extrapolation from the past (Zentner, 1975; Mandel, 1985). Within the context of an alternative future depicted by a scenario, the decision-maker can identify causal relationships between environmental forces, the probable impacts of these forces on the organization, the key decision points for possible intervention, and the foundations of appropriate strategies (Kahn and Wiener, 1967; Sage and Chobot, 1974; Martino, 1983; and Wilson, 1978). By providing a realistic range of possibilities, the set of alternative scenarios facilitates the identification of common features likely to have an impact on the organization, no matter which alternative occurs. It is conventional to create from three to five such histories to cover the range of uncertainty.

Policy Analysis

We initiate policy analysis when we have completed the scenarios . Since a scenario represents a forecast, we evaluate it by the same criteria described earlier (i.e., clarity, intrinsic credibility, plausibility, policy relevance, urgency, comparative advantage, and technical quality). Once we have satisfied these criteria , we review each scenario for explicit or implied threats and opportunities -- the objective being to derive policy options that might be taken to avoid the one and capture the other. It is here that the value of this approach may be judged, for the exercise should result in policies that could not have been developed without having gone through the process.

Action Plans

Action plans are directly derived from the policy options developed through reformulating each option as a specific institutional objective. It is possible to assign

responsibilities for developing detailed action plans and recommendations for implementation to members of the planning team. Typically, these staff members have knowledge, expertise, and functional responsibilities in the area related to and/or affected by the implementation of the strategic option. The staff will incorporate the resulting action plans into the institution's annual operational plan as institutional objectives assigned to appropriate functional units with projected completion dates (Morrison and Mecca, 1988).

Summary

The purpose of an environmental scanning/forecasting system is to provide community college administrators information that can facilitate better decision-making, particularly in making decisions affecting the long-range future of their institutions. Given that we live in an age of "future shock" where changes in the external environment occur with ever-increasing rapidity, educational leaders are faced with a future that most assuredly will be different from the present. This chapter has reviewed the salient literature describing a basic approach used to manage this uncertainty--identifying issues/concerns based upon experience and upon environmental scanning, structuring issues in the form of trends and events, forecasting the "most likely" future of these trends and events, assessing the interrelationships of these trends and events through cross-impact analysis, and producing alternative scenarios of plausible futures that stimulate the development of viable and robust strategic options that can be incorporated in specific institutional plans. This approach varies from a traditional long-range planning approach based upon a single set of environmental assumptions about the future. It recognizes that that, although the future, is a continuation of existing trends, it is subject to modification by events that have some probability of occurrence. Indeed, it is potential events that cause environmental uncertainty. We cannot predict the future, because uncertainty is a

potential events and their interrelationships. However, by using the best available information, we can anticipate plausible alternative futures and, thereby, limit the number of unanticipated possibilities to the smallest possible set.

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